



MATATAG

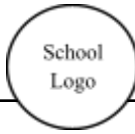
Bansang Makabata



Batang Makabansa



BAGONG PILIPINAS



School
Logo

Name of School:		Quarter:	4th Quarter
Grade Level & Section:	Grade 7	Week:	Week 8 Day 2
Subject:	SCIENCE	Date and Time:	
Topic:		Teacher:	

I. CONTENT, STANDARDS AND LEARNING COMPETENCIES		ANNOTATIONS
A. CONTENT STANDARDS	The learners learn that: 1. Solar energy influences the atmosphere and weather patterns	
B. PERFORMANCE STANDARDS	By the end of the quarter, learners will use reliable scientific information to identify and explain how solar energy influences the atmosphere and weather systems of the Earth. They will also use such information to appreciate and describe the dominant processes that affect the climate of the Philippines.	
C. LEARNING COMPETENCIES	Make a physical model or use drawings to demonstrate how the tilt of the Earth relative to its orbit around the Sun affects the intensity of sunlight absorbed by different areas of Earth over a year. Explain how solar energy contributes to the occurrence of land and sea breezes, monsoons, and the Intertropical Convergence Zone (ITCZ). Lesson Objectives: 1. Explain how topography affects climate. 2. Differentiate the windward and leeward sides of the mountains. 3. Explain the occurrence of land breezes and sea breezes. 4. Explain the role of solar energy in driving processes that contribute to the formation of ocean currents.	

I. CONTENT

The Tilt of the Earth and Its Effect on Earth's Climate

II. LEARNING RESOURCES

A. REFERENCES

B. OTHER LEARNING RESOURCES

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III. TEACHING AND LEARNING PROCEDURE

BEFORE/PRE-LESSON PROPER

ACTIVATING PRIOR KNOWLEDGE

Directions: Answer the following questions based on what you have learned. Provide clear and complete explanations.

1. Why do some parts of the Earth receive more heat than others?
2. How does the unequal heating of land and water affect climate?
3. How does the Earth's tilt contribute to the changing seasons?
4. Why do higher altitudes have colder temperatures?
5. Explain the orographic effect and how it influences rainfall.

ANSWER

1. Some parts of the Earth receive more heat than others because of the Earth's curvature. Areas near the equator receive direct sunlight, making them warmer, while areas near the poles receive sunlight at an angle, spreading the energy over a larger area, making them cooler.

2. Land heats up and cools down faster than water. This difference creates variations in temperature and pressure, leading to wind patterns and ocean currents. Coastal areas experience milder climates because water absorbs and releases heat more slowly than land.

3. The Earth is tilted at **23.5°**, meaning different parts of the Earth receive different amounts of sunlight throughout the year. When a hemisphere tilts toward the Sun, it experiences summer, and when it tilts away, it experiences winter.

4. As altitude increases, air pressure decreases, making it harder for the air

		<p>to retain heat. This causes temperatures to drop by approximately 6.5°C for every 1,000 meters of elevation. That is why mountainous areas are colder than lowlands.</p> <p>5. The orographic effect occurs when moist air rises up a mountain. As the air rises, it cools and condenses, causing precipitation on the windward side of the mountain. The air then loses moisture and becomes dry as it moves down the leeward side, creating a rain shadow effect with less rainfall.</p>
<p>LESSON PURPOSE/INTENTION</p>	<p>Lesson Purpose</p> <p>Define the windward and leeward sides of a mountain.</p> <p>Explain how mountains influence weather patterns and precipitation through the orographic effect.</p> <p>Differentiate the characteristics of the windward and leeward sides in terms of temperature, humidity, and vegetation.</p> <p>Provide examples of real-world locations where the windward-leeward effect is observed.</p> <p>Analyze how the windward and leeward sides impact human settlements, agriculture, and climate adaptation strategies.</p>	
<p>LESSON LANGUAGE PRACTICE</p>	<p>Vocabulary</p> <ul style="list-style-type: none"> o Windward Side – The side of a mountain that faces the wind and receives more rainfall due to rising moist air. 	

- o **Leeward Side** – The side of a mountain that is sheltered from the wind, receiving less rainfall and often having a drier climate.
- o **Orographic Effect** – The process in which moist air rises along a mountain, cools, condenses, and releases precipitation on the windward side.
- o **Precipitation** – Any form of water (rain, snow, sleet, or hail) that falls from the atmosphere to the Earth's surface.
- o **Humidity** – The amount of moisture or water vapor present in the air.
- o **Rain Shadow** – A dry region on the leeward side of a mountain where little precipitation occurs due to the loss of moisture in rising air.
- o **Condensation** – The process of water vapor cooling and changing into liquid droplets, forming clouds and precipitation.
- o **Evaporation** – The process of liquid water turning into water vapor due to heat.
- o **Air Mass** – A large body of air with uniform temperature, humidity, and pressure that moves across regions.
- o **Climate** – The long-term weather patterns of a particular area, influenced by geographical features such as mountains.

DURING/LESSON PROPER

**READING
THE KEY
IDEA/STEM**



I. Introduction

Mountains play a crucial role in shaping weather and climate. One of the most important effects of mountains is how they influence rainfall and temperature through the **orographic effect**. This process creates **two distinct sides of a mountain**—the **windward side** and the **leeward side**. Understanding these sides helps explain why some regions are lush and green, while others are dry and arid.

II. Understanding the Windward and Leeward Sides

1. The Windward Side

- The **windward side** of a mountain is the side that **faces the incoming wind**.
- As warm, moist air moves toward the mountain, it is **forced to rise** due to the mountain acting as a barrier.
- As the air rises, it **cools and condenses**, forming clouds and resulting in **precipitation** (rain or snow).
- This side is usually **cooler, wetter, and supports lush vegetation** because of the frequent rainfall.
- **Examples:**
 - The **eastern slopes of the Sierra Madre mountains in the Philippines** receive heavy rainfall due to winds from the Pacific Ocean.
 - The **Hawaiian islands** have green, tropical forests on the windward sides of their mountains.

2. The Leeward Side

- The **leeward side** of a mountain is the side that is **sheltered from the wind**.
- After the air releases its moisture on the windward side, it **descends** on the leeward side.
- As the air descends, it **warms up and dries out**, leading to **less precipitation** and creating a **drier climate**.

- This effect is called a **rain shadow**, and it often results in **arid or semi-arid conditions**.
- **Examples:**
 - The **western side of the Sierra Madre mountains** is drier compared to the eastern side.
 - The **Atacama Desert in Chile** lies in the rain shadow of the Andes Mountains, making it one of the driest places on Earth.

III. The Orographic Effect: How It Works

The **orographic effect** explains why one side of a mountain gets more rain than the other. The process follows these steps:

1. **Warm, moist air** moves toward a mountain.
2. As the air encounters the mountain, it is **forced to rise**.
3. Rising air **cools down**, leading to **condensation and cloud formation**.
4. Rain falls on the **windward side** due to the cooling and condensing of moisture.
5. Once the air reaches the top, it has lost most of its moisture.
6. The dry air **descends** on the **leeward side**, warming up and creating a **dry climate**.

This process explains why **coastal regions near mountains** are often wetter, while **inland regions behind mountains** tend to be dry.

IV. Effects on Climate and Human Activities

- **Agriculture:**
 - The **windward side** is good for farming due to high rainfall and fertile soil.
 - The **leeward side** may require irrigation because of lower rainfall.
- **Settlements:**
 - People often settle on the **windward side** because of the availability of water and vegetation.
 - The **leeward side** may have fewer settlements due to dry conditions, but it can be suitable for industries like **tourism** (deserts) and **livestock farming**.

- **Weather and Natural Disasters:**

- The **windward side** may experience frequent typhoons and heavy rainfall, leading to floods.
- The **leeward side** may suffer from droughts and wildfires due to dry conditions.

Feature	Windward Side	Leeward Side
Facing Direction	Faces incoming wind	Opposite of incoming wind
Air Movement	Rising air	Descending air
Temperature	Cooler	Warmer
Moisture	High (humid)	Low (dry)
Rainfall	Heavy precipitation	Little to no precipitation
Vegetation	Lush, green forests	Dry, desert-like environment
Example Locations	Eastern Philippines, Hawaii	Western Philippines, Atacama Desert

**DEVELOPING
and
DEEPENING
UNDERSTANDI
NG OF THE KEY
IDEA/STEM**

Activity

 **Materials Needed:**

- Paper or notebooks
- Colored pencils or markers
- Internet or textbook references

 **Instructions:**

1. Draw a simple mountain diagram with **two sides** (windward and leeward).
2. Label the **windward side** and the **leeward side**.
3. Use **arrows** to show the direction of wind and moisture movement.
4. Draw and label **clouds, rain, lush vegetation** on the windward side.
5. Draw and label **dry air, desert, or grassland** on the leeward side.
6. Below your drawing, write a short paragraph explaining the differences between the two sides.

◆ **Discussion Question:** *Why do some cities on the windward side receive more rainfall than those on the leeward side?*

AFTER AFTER/POST-LESSON		
MAKING GENERALIZATIONS AND ABSTRACTIONS	<p>Worksheet</p> <p>Synthesis/Extended</p> <p>What you have learned In a one sheet of paper write something you understand about the lesson we discussed today.</p>	
EVALUATING LEARNING	<p>Directions: Read each question carefully and choose the best answer. Encircle the letter of your choice. The correct answers are provided at the end.</p> <p>1. What is the main characteristic of the windward side of a mountain?</p> <p>a) It is dry and has little rainfall. b) It receives heavy precipitation and has lush vegetation. c) It is warmer and has low humidity. d) It is always covered in snow.</p> <p>2. What process causes precipitation to occur on the windward side of a mountain?</p> <p>a) Evaporation b) Orographic effect c) Condensation d) Rain shadow effect</p> <p>3. What happens to the air as it rises along the windward side of a mountain?</p> <p>a) It warms up and absorbs moisture. b) It cools down and condenses, forming clouds and precipitation. c) It remains at the same temperature and humidity. d) It speeds up and moves directly to the other side.</p> <p>4. Which of the following best describes the leeward side of a mountain?</p> <p>a) It receives more precipitation than the windward side. b) It is dry due to the rain shadow effect. c) It is the side that faces the incoming wind.</p>	<p>ANSWER</p> <p>1.B 2.B 3.B 4.B 5.A</p>

	<p>d) It has a cooler and wetter climate than the windward side.</p> <p>5. Why is the leeward side often drier than the windward side?</p> <p>a) The air has already lost most of its moisture before reaching the leeward side.</p> <p>b) The leeward side is closer to the ocean.</p> <p>c) The wind always blows away from the leeward side.</p> <p>d) The sun shines more directly on the leeward side, making it hotter.</p>	
ADDITIONAL ACTIVITIES FOR APPLICATION OR REMEDIATION (IF APPLICABLE)		
REMARKS		
REFLECTION		

Prepared by:

Subject Teacher
Teacher

Reviewed by:

Master Teacher/Head